

REMARKS

This Amendment is submitted in response to the Office Action mailed on November 3, 2009. Claims 24, 47, 49 and 50 have been amended, and claims 24-45, 47, 49 and 50 remain pending in the present application. In view of the foregoing amendments, as well as the following remarks, Applicant respectfully submits that this application is in complete condition for allowance and requests reconsideration of the application in this regard.

Claim 47 stands rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite. Claim 47 also stands rejected under 35 U.S.C. §102(b) as being anticipated by Nakagawa et al., U.S. Patent No. 5,599,743. Claims 24-45, 49 and 50 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Song et al., U.S. Patent No. 6,821, 901 in view of Ye et al., U.S. Patent No. 6,270,687 and further in view of Yin et al., U.S. Patent No. 6,270,617. While Applicant respectfully traverses these rejections, Applicant has amended each of independent claims 24, 47, 49 and 50 to more sharply define the claimed invention over the prior art of record and respectfully requests that the rejections be withdrawn.

Applicant has amended independent claim 47 to overcome the rejection under 35 U.S.C. §112, second paragraph. Applicant has further amended independent claim 47 to overcome the rejection of this claim as being anticipated by Nakagawa et al. In particular, Applicant has amended this claim to clarify the claimed ranges and to

positively recite an etching step wherein the masked wafer is etched in accordance with the desired selective removal of material from the surface of the wafer.

In the manufacturing method of Nakagawa et al., the underlying substrate is not etched at all but rather it is the aluminum film that is etched to form the interconnection pattern. See, Abstract, Col. 5, lines 46-50 and Col. 8, lines 6-12. Consequently, Applicant respectfully submits that amended independent claim 47 defines over Nakagawa et al. taken alone, or in combination with the other prior art of record, and the rejections of this claim should be withdrawn.

With respect to the rejections of independent claims 24, 49 and 50, the Examiner will note that each of these claims has been amended to clarify that the material from the surface of silicone-containing substrate is being etched. In the rejections of these claims, the Examiner has taken the position that it would have been obvious to one of ordinary skill in the art to incorporate an inductive coupling coil in the form of a cylinder as allegedly taught by Ye et al. in the plasma reactor of Yin et al. to arrive at Applicant's claimed invention as recited in each of independent claims 24, 49 and 50.

However, the Examiner will appreciate that Ye et al. appears to be directed to an inductively coupled etch reactor for use in etching aluminum from the surface of a workpiece and not to etching of a surface of a silicone-containing substrate as recited in each of claims 24, 49 and 50. Ye et al. also appears to suggest moving

the coil nearer to the workpiece so as to create a high plasma ion density near the exposed surface of the workpiece. See, Col. 4, lines 26-32.

This is in stark contrast to the presently claimed invention as recited in each of independent claims 24, 49 and 50 wherein the substrate surface is kept at a distance from the lower edge of the inductive coupling coil of at least two times, and preferably at least three times, the mean free path length of the plasma atoms, or at a distance of at least 8 cm from the lower edge of the inductive coupling coil.

Moreover, as previously argued by Applicant, in each embodiment of Yin et al. wherein the coil is spaced from the substrate (see FIGS. 22A-22C and 24A-24D), the coil is either flat (FIGS. 22A and 24A) or has a dome shape (FIGS. 22B-22C and 24B-24D). The flat or domed coil shapes are provided in these plasma reactor embodiments of Yin et al. to achieve the desired radial ion density distribution across the wafer. See, Col. 14, lines 59-63.

Applicant respectfully submits that there is no teaching or suggestion to incorporate the cylindrical coil shape of Ye et al., used in an RF plasma method for etching aluminum from the surface of a workpiece, into the plasma reactor of Yin et al. since the reactor of Ye et al. appears to be directed to etching of aluminum from the surface of a workpiece and the flat or domed coil shapes provided in the RF plasma reactor of Yin et al. are required in the reactor embodiments of FIGS. 22A-22C and FIGS. 24A-24D to achieve the desired distribution of plasma ion density at the wafer surface.

While there is no teaching or motivation to modify the reactor of Yin et al. to incorporate the cylindrical coil shape of Ye et al., such a modification of the Yin et al. reactor in any event would destroy the intended purpose and function of the Yin et al. reactor to include a multi-radius dome shape having a coil that is either flat or dome shaped to achieve the desired plasma ion density distribution at the wafer surface.

Consequently, Applicant respectfully submits that each of independent claims 24, 49 and 50 defines patentable subject matter of Yin et al. taken alone, or in combination with the other prior art of record, and the rejections of these claims should be withdrawn.

Moreover, as claims 25-45 depend from allowable independent claim 24, and further as each of these claims recites a combination of steps not fairly taught or suggested by the prior art of record, Applicant submits that these claims are allowable as well.

CONCLUSION

In view of the foregoing response including the amendments and remarks, this application is submitted to be in complete condition for allowance and early notice to this affect is earnestly solicited. If there is any issue that remains which may be resolved by telephone conference, Examiner is invited to contact the undersigned in order to resolve the same and expedite the allowance of this application.

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Please see the electronic fee calculation sheet for the charge in the amount of \$1,110 for the three months extension fee as required by 37 C.F.R. §1.17(a)(3). If any other fees are necessary, the Commissioner is hereby authorized to charge any underpayment or fees associated with this communication or credit any overpayment to Deposit Account No. 23-3000.

Respectfully submitted,

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